Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

BASES ON WHICH STUDENTS CAN BE CLASSIFIED EFFECTIVELY

FRANK N. FREEMAN
University of Chicago

In order to determine how students should be classified and what instruments can best be used for making the classification, we should have in mind the reasons why they ought to be classified. The manner of carrying out the classification depends upon the aims which we have in making it.

The classification of pupils goes back fundamentally to our general theory of group instruction. If pupils are to be taught in groups, then obviously some principle must be found according to which they shall be grouped. It is, of course, not necessary to go into any detail in support of the practice of group instruction. While many modifications have been made and will continue to be made in the type of group instruction and in the manner of making up the group, there seems to be no likelihood that the method will be abandoned. It rests, in the first place, on economy. Economy, however, is a consideration which might be regarded as incidental. A more fundamental reason for grouping is the mutual stimulation which comes from it. There is much stronger incentive to intellectual activity in association with others than in solitary study. In fact, this sometimes appears to be the chief incentive to a great many types of school work.

In addition to this intellectual value from grouping, appears the training which pupils receive in making social adjustment and in learning to work co-operatively with others, as well as the pleasure and satisfaction which they derive from their school association. Group instruction, then, may be considered as an established method.

The chief basis of classification has grown out of the grading system, and this in turn has depended upon age as its basis. The time of entrance upon school work, the time of promotion, and the time of graduation have been based fundamentally on chronological age. As a consequence, the pupils who are thrown together have been theoretically those of the same age.

The age basis, however, has proved inadequate, at least under existing conditions. The chief ground of this inadequacy is the intellectual inequality or the differences in intellectual maturity of pupils of the same age. This inequality is a matter of very frequent comment, and many investigations have given objective evidence upon it.

TABLE I

VARIATIONS IN PROGRESS OF PUPILS DURING TWELVE WEEKS OF DRILL IN ARITHMETIC*

	AVERAGE DAILY SCORE FOR EACH WEEK											
	1	2	3	4	5	6	7	8	9	10	11	12
Pupil A:												
Attempts	3.2	3.3	3.5	3.7	3.8	3.9	3.7	3.4	2.8	2.6	2.6	2.7
Rights	.0	.0	.1	.1	.1	.0	.0	.0	.1	.2	.3	.4
Pupil B:												
Attempts	11.2	12.0	13.2	14.3	15.3	16.1	16.8	17.2	17.5	17.8	18.0	18.2
Rights	8.6	9.2	10.3	11.5	12.6	13.4	14.0	14.5	15.0	15.6	16.2	16.5
Poorest quarter of entire group:												
Attempts	5.1	5.3	5.6	5.9	6.2	6.4	6.4	6.4	6.5	6.6	6.8	6.9
Rights	1.4	1.5	1.7	2.0	2.2	2.3	2.4	2.5	2.6	2.7	2.7	2.6
Best quarter of entire group:												
Attempts	7.6	8.2	9.1	10.1	10.9	11.5	12.1	12.6	13.0	13.4	13.7	13.9
Rights	4.5	5.2	6.2	7.2	7.9	8.5	9.0	9.3	9.5	9.6	9.7	9.8

* Quoted from an unpublished report by L. O. McAfee, superintendent of schools, Pony, Montana.

A few concrete illustrations may appropriately be offered in support of the general position that age is not a completely satisfactory basis for classification. In Table I are shown the records of certain pupils who were given twelve weeks' drill in column addition. The records designated A and B give the average standing of two individual pupils for each week of the experiment. In the first line of each record are given the attempts and in the second line the rights. It will be seen that pupil A attempted an average of from 2.6 to 3.9 problems. For five of these weeks the average rights was zero. The highest average was four-tenths of a problem. Throughout nine weeks there is no evidence of any gain. The slight gain at the last may not be permanent. In the case of pupil B the gain is marked in both attempts and rights. The scores in both are high throughout the entire period, and the ratio of rights to attempts is high and increases consistently. Whatever may be the cause of this difference, there could hardly be a sharper contrast than is found here between the attainments of two pupils under identical conditions of practice.

That these are not isolated cases is shown by the average scores of the best quarter of the pupils and of the poorest quarter. The gain made by the best quarter is greater, absolutely and relatively, than that made by the poorest quarter. At the end, the score in rights of the best pupils is nearly four times as high as that of the poorest pupils, and the ratio of rights to attempts is much higher in the case of the best pupils. It would hardly be possible to imagine stronger evidence of the need of giving some kind of differential treatment to the pupils of greater and of lesser ability. Classification may not be the only solution of the problem of treatment, but at any rate it suggests itself as one of the means at hand for dealing with such pronounced differences.

To this evidence from school achievement may be added the evidence from so-called intelligence tests. Three simple illustrations may be taken. We may compare the range of ability of pupils of a given class or of a given age with the annual increment in ability, or the advance in score, resulting from a year's development. In the case of the Chicago Group Intelligence Test, for example, the range of the middle 50 per cent of the ninth grade is about eight points. The gain which is made from one grade to another is five points. The middle 50 per cent therefore have a range which is one and three-fifths times as great as the yearly gain. In the Otis test the range of the middle half of the thirteen-year-old pupils is three times the increase from the twelfth year to the thirteenth year. In the case of the Pintner Non-Language Test, the range of the middle half of the twelfth year is seven times the annual increment.

One final illustration. In a neighboring high school, as reported to the writer by E. L. Moyer, the Freshmen students in mathematics were divided into three groups on the basis of intelligence-test scores. The three groups were given the same subject-matter, but it was adapted so far as possible to the ability of the pupils. In spite of this adaptation, 50 per cent of the failures of the entire class were found in the lowest third.

It is true that such facts as these may perhaps not be taken at quite their face value. The experiments which are being conducted in the laboratory schools of the University of Chicago, under the direction of Professor Morrison, suggest that the differences in the achievements of various pupils may be accounted for in part by gaps in previous preparation. A pupil's failure in a class may be due in part to the lack of understanding of topics which are prerequisite to the one he is studying. With due allowance for such possibilities, however, the fact remains that some pupils overcome such handicaps more readily than others. A bright pupil may even skip an entire grade and not be especially handicapped thereby. The gaps in pupils' understanding may be evidence that slowness of apprehension prevented their understanding a topic when it was presented in class. There seems to be such abundant evidence of marked differences in capacity that the problem of differential treatment becomes a very serious one.

There have, of course, been many attempts to adapt instruction to the inequalities of pupils within each age group. One general class of attempts retains the fundamental age group and endeavors to do away with retardation by some type of individual help, as in the Batavia Plan. Such schemes do not permit a radical change of the curriculum in adaptation to the ability of individuals, nor do they allow variations in the speed with which pupils may master it.

More radical plans involve dividing pupils into ability groups at different age levels. These groups may then follow the same general curriculum but may pursue the work with a different degree of thoroughness or detail. A still more radical method is to break up age levels by allowing either individuals or groups to advance more rapidly or more slowly, with or without a change in the character of the work pursued by the different groups.

A classification of pupils on the basis of age levels or other developmental levels may be called a horizontal classification. Classification within one of these levels into groups which are defined according to ability may be called vertical grouping. What are the fundamental considerations demanding the one or the other of these types?

We may consider broadly two general bases for grouping, the social and the intellectual, and their relationship to the horizontal grouping and the vertical grouping. There is satisfactory evidence that children go through certain developmental stages in their social reactions and that these stages determine to a large degree the groups into which they should be placed. Such stages are illustrated in the play types which are characteristic at different ages. If the social basis of grouping is of any importance, as has been maintained, then such a consideration as this demands horizontal classification based upon developmental stages. Chronological age serves as a rough criterion for such classification, but a more accurate basis is physiological age. We do not possess as yet an accurate and convenient method for diagnosing physiological age, but such facts as height, weight, rate of growth, dentition, and the pubertal signs serve as useful provisional criteria. The level of social development as indicated by physiological age, then, serves as one basis for a rough classification according to developmental levels.

On the intellectual side we have at least two possible types of criteria for classification. The first is somewhat analogous to the classification on the basis of social development. It is perhaps more problematical whether there are stages in intellectual growth which correspond to the stages in social development already mentioned. The matter may be cleared up by a distinction between mere intellectual ability and type of intellectual interest. The evidence seems to indicate pretty clearly that whatever the capacity of children at various stages, their interests show fairly well defined stages of development. This factor may be taken to determine the subjects or the topics which are suitable for a pupil at a given stage, while the level of work, or the depth to which the child can penetrate in pursuing a given type of work, may vary according to his ability.

It is customary to interpret the results of intelligence tests as indicating a gradual growth in ability, on the one hand, and identity between the ability of brighter pupils at the lower ages and average or dull pupils at higher ages, on the other hand. This conception may be illustrated graphically by the growth curves from one of Pressey's tests (Figure 1).[1] We see that the improvement of the ten-percentile, the median, and the ninety-percentile children is approximately constant in rate. The ninety-percentile child at eight years, moreover, is about equal in ability to the median child at ten years. According to such a chart as this, if taken at its face value, it would be perfectly legitimate on the intellectual side to group together children of very widely different ages and of very widely different stages of physical development.

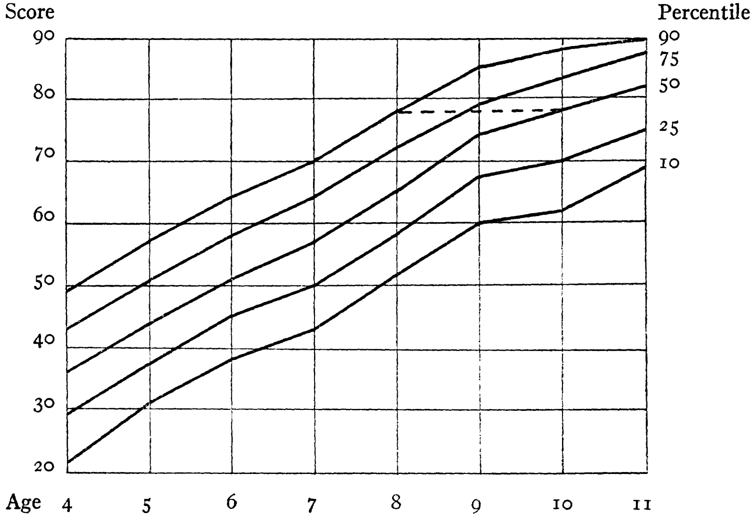

FIG. 1.—Curves for the various percentile groups in the Pressey Cross-out Test

From the results of a more detailed type of test, however, we get a different picture. Figure 2 represents the growth curves of children at eleven different levels in the Picture Completion Test, as reported by Pintner.[2] The lowest curve is made from the lowest records of the respective age groups of children. Each of the succeeding curves is made from the next higher ten-percentile scores of the various age groups. Thus, each curve represents the mental growth of the typical child at a given level of intellectual ability. We see that in this more particular or specialized ability there is a marked crisis in development at a particular age, namely nine years, rather than a constant growth at uniform rate throughout the entire period of childhood. We see, moreover, that this acceleration in growth comes at the same age for the superior and inferior children as for the average child. This suggests that in the case of particular abilities, whatever may be true of a composite of many abilities, there may be stages in development which correspond to given stages in physiological growth and which are common to children of widely different degrees of intellectual ability. If this is true, it indicates that there are intellectual as well as social factors which point to the need of a basic horizontal grouping.

---

[1] This figure has been drawn from unpublished norms communicated by Dr. Pressey.

[2] R. Pintner and M. M. Anderson, *The Picture Completion Test*. Baltimore: Warwick & York, 1917.

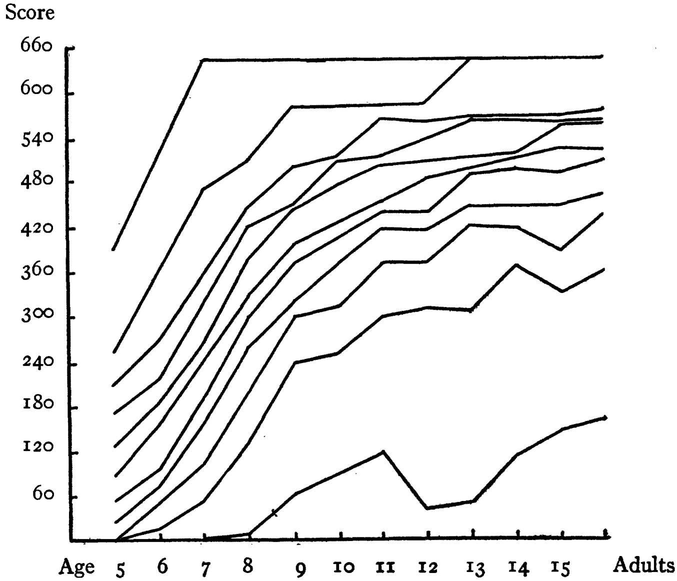

FIG. 2.—Age-progress curves of eleven ten-percentile groups in Picture Completion Test.

The necessity of vertical grouping on the ground of intellectual differences is evident from either of the two figures as well as from the facts presented earlier. Even if children go through similar intellectual stages at similar developmental periods, they go through these stages at widely different levels. These differences in brightness, as we may call them, would seem to demand a classification running in the other dimension than the developmental one, and it is with the technique of making this classification that we are now concerned.

The fundamental criterion for making this vertical classification must be considered to be ability to do school work. This ability is, of course, a composite affair and needs to be analyzed, but the most useful procedure is, first, to obtain an estimate of the pupil's ability by an undifferentiated measure and, then, to determine the factors which enter into the pupil's ability to do school work, so that we may know how to deal with his case individually.

The most direct measure of the pupil's capacity to do school work is his past school record. Investigations have shown that there is a fairly close correlation between the pupil's relative standing in one school or one grade and his relative standing in the succeeding school or grade. In Clement's[1] investigation it was found that when the pupils of the elementary school were divided into three groups according to their average standing, 75 per cent of those in the upper and lower thirds remained on the same side of the median in high school. The same relation was found between standing in high school and college. Dearborn[2] also investigated the relation between high-school standing and college standing and found that on the average over 50 per cent of the pupils in the highest fourth and in the lowest fourth in high school remained in the corresponding fourth in the Freshman year of college. Similar correspondence was found by President Lowell[3] between college standing and professional-school standing.

The tabulation of the pupil's standing in the lower school presents some difficulties. It has the advantage, however, of being the same kind of composite which is measured by the standing in the high school. When it can be obtained, its correlation with subsequent standing is about the same as is the correlation between intelligence tests or a series of examinations with this subsequent standing.

---

[1] J. A. Clement, *Standardization of the Schools of Kansas.* Chicago: University of Chicago Press, 1912.

[2] W. F. Dearborn, "The Relative Standing of Pupils in the High School and the University," *Bulletin of the University of Wisconsin,* No. 312, 1909.

[3] A. Lawrence Lowell, "College Studies and Professional Training," *Educational Review,* XLII (October, 1911), 217–33.

If our interest were simply in making a rough classification and prediction of the achievement of pupils in the high school, we might regard the intelligence test as being as satisfactory as the school standing. There is an important reason, however, why it is desirable to use both measures. Because the school standing gives a composite measure and the intelligence test a somewhat more narrowly defined measure, it is possible by a combination of the two to make an analysis of the pupil's ability which could not otherwise be made. Such an analysis is particularly demanded where the pupil's school record and his intelligence-test record show wide discrepancies. This discrepancy may indicate a superior standing in the test to that in the school or an inferior test rating. In either case, it is apparent that the two are measuring somewhat different abilities, or that one or the other is inaccurate as a measure of the pupil's capacity.

An illustration of the variation in the factors measured by the test and the school standing may be borrowed from a study by Bracewell.[1] He found three students in a Freshman class who were ranked in the highest third by the tests, but in the lowest third by the teachers. An analysis of these cases revealed that the first was addicted to cigarettes and put very little effort into his school work. He later raised his school standing to the middle group. The second was a country girl who had had very meager educational advantages. She had never read a book or written a letter, and English was very poorly spoken at her home. The third was in very poor health and was absent from school a large share of the time. Of forty pupils ranked in the middle section by the test, thirteen were ranked in the top section by the teachers. These pupils were discovered to be unusually industrious and conscientious in their work. Such facts as these, which are of great significance in dealing with pupils, can be discovered only by a comparison of the general school rating with the rating in the tests.

---

[1] Ray H. Bracewell, "The Freeman-Rugg General Intelligence Tests as an Aid to Economy in School Administration," *School Review*, XXIX (June, 1921), 460–66.

Tests are valuable, then, in that they help to interpret the pupil's school record. On the other hand, the school record and teachers' judgments are often valuable as means of interpreting the results of tests. The tests do not furnish a complete measure of the capacity which underlies achievement. They do measure fairly accurately ability of the academic type under the conditions of a spurt in which speed is an important factor. They fail to measure, in anything like the same degree, the pupil's staying power, his ability to organize large masses of material, and his independence and initiative. They often do some injustice to the comparatively slow, but accurate, and perhaps profound student. On quite another ground, they sometimes do injustice to the nervous student who is easily flustered under test conditions. Pupils who do not make an especially high score in the test, because of such factors as these, may do much better work in the course of their school work.

Tests, school work, and teachers' judgments should be used in conjunction with one another even in estimating the pupil's probable intellectual achievement or the intellectual factors in his achievement. But there are other characteristics of a non-intellectual sort which also contribute to the pupil's achievement. These characteristics are sometimes summed up under the head of school attitude. One pupil is docile, tries to please, and is interested in securing the approval of the teacher. Another pupil is indifferent and perhaps even obstinate or disgruntled. Such characteristics as these form a part of the foundation of the pupil's achievement and are not revealed by the tests. They can be estimated by teachers. Frequently the judgments of different teachers on such characteristics as these differ widely. Such variation, indicating the difference in reaction of the pupil to different teachers, may be an important part of our information concerning him. Traits of the type here considered are sometimes termed character traits or moral traits. We might extend the list of these traits to considerable length, but the illustration already given is sufficient.

Traits which seem to be moral or intellectual sometimes prove on examination to be physical. The study of the pupil's health and physical strength is therefore a very desirable supplement to the other types of examination. Home conditions and general environment also suggest themselves as factors which are frequently important in pupils' school work.

Some such procedure as the following would seem to be warranted by the foregoing facts and considerations. In the first place, the pupil's position in the horizontal grouping should be determined as accurately as possible by the methods which have thus far been perfected. This is, of course, a matter which concerns the pupil's progress all along the line and somewhat more in the elementary school than in the high school. But it concerns the entrance of the pupil into the high school, his progress through it, and is very pertinent to the organization of the junior high school.

In the second place, the pupil's position in the vertical grouping is to be found. If an adequate rating in terms of previous school standing can be obtained, it is suggested that this be used to determine a preliminary or trial placing. Otherwise, an intelligence test should be used for the trial grouping. If school standing is used as the first measure, the standing in a mental test should be found and compared with this school standing. Those pupils whose school standing and test rating correspond may be considered satisfactorily placed. A more careful study should be made of the discrepant cases by gathering estimates of teachers on such matters as temperamental, moral, or character traits and school attitude. The pupil's interests and aims should be investigated. His physical condition should be examined. His environment, home and other, should be inquired into in search for conditions which may be injurious to the pupil physically or mentally or which may perhaps be especially favorable. Such detailed study may enable us not only to place the pupil according to his probable achievement but also to say why he is placed as he is and in some cases to discern the possibility of bringing about an alteration in his achievement so that his classification may be raised. For after all, our aim is not merely to measure the student's actual achievement and to classify him accordingly; it is also to discover his potential achievement and to stimulate him to attain it.